Day of the Week Effect and Month of` the Year Effect on Indian Stock Market Returns

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Abstract

The efficient market hypothesis is an important concept that measures the efficiency of the market by stating that investors cannot make abnormal profits by stock trading on the available information. stock returns and variability in returns are prominent area of interest of investors, traders, researchers and market regulators. This study explores the very widely tested seasonally anomaly of day of week effect and month effect for the Indian stock market over the period of January 2010 to December 2020 by employing descriptive statistics ad regression analysis. The results provide empirical evidence of the month effect of March and October and no evidence of day of week effect from the statistical evidence but from the daily mean returns, we observe the Monday negative and Friday higher positive return. Further, the literature evidence that supports the argument that day effect seasonal anomaly are not consistent and do not exist in the study. The paper reports the prevalence of monthly effects in the Indian stock market and this would aid investors in designing investment strategies based on March and October effect anomaly in earning return over portfolio investment.

Keywords: Seasonal Anomaly, Day of Week Effect, Month Effect, Efficient Market Hypothesis.

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INTRODUCTION

The literature document of Eugene Fama(1970) has defined efficiency of capital market in many ways. Despite the extensive contribution of research in support of market efficiency, studies of economist has shown interest in both market behavior and the psychology of individual decision making have proves that asset pricing models are not rationally relavant to economic realities. Summers (1982), Shoven and Weiss (1980) observed that the currently low level of the stock market could not be rationally related to economic realities. The work by Kahneman and Tversky (1979) and others has sought to provide a theory which describes how decision makers actually behave when confronted with choice under uncertainty. Arrow (1982) has conclude that psychological models of 'irrational decision making' have helped in explaining role of behavioral aspect in securities market .This has put in light of a number of evidence suggesting the existence of stock market anomalies in developed and emerging markets.

In recent times calendar effects has attracted the interest academicians and market practitioners for decades. The

most popular calendar anomalies observed by Keim (1983) are the day-of-the-week effect and turn-of-the year-effect. He observed that the average risk –return for a portfolio of small cap funds are higher in January and lower effect for the rest of the year. This January effect is found to be affected more for small cap funds more than the mid cap funds or large cap funds. Calendar effect indicates the changes in stock index price behavior in capital market forming a certain pattern based on seasonal effects. Such patterns may occur at a regular or specific interval of time in a calendar year. Presence of such market anomalies in any capital market is contrary to the concept of efficient market hypothesis as these market anomalies may give scope for participant to make abnormal profits by early prediction of patterns of market anomalies This presence are against the basic assumption of efficient market hypothesis (EMH) that market are efficient and there exist perfect competition and no one can beat the market and make abnormal profit in stock market. The remainder of this paper is organized as follows .Section II provides a brief literature review. Section III explains the data collected and methodology utilized .The empirical finding are reported in Section IV, and the Section V findings and discussion of the results and VI provides a summary and conclusion of the paper.

LITERATURE REVIEW

The idea of Efficient Markets were investigated by analysts and understood by the security brokers, these anomalies keep on existing for a quite long time ,a while this itself an error in stock market behavior. They include month of the year, day of the month and day of the week impacts. Lakonishok and Smidt (1988) observed that a few market anomalies in stock return exist in the given sample including the end of the week or Month effect. Sullivan et al. (2001) in their studies observed the calendar market anomaly   evaluate of in context of universe for abnormalities demonstrate that once calendar effect, including day of the week effect , are assessed with regards to the entire universe has no longer impacts remain significant. A few other supporting theories have been proposed to justify the day of the week impact. Information released theory explain that negative data is last long till end of the week effect to reduce the impact of high impact selling pressure impacts over week days in stock returns and stock volatility (Damodaran, 1989; French, 1980). Gibbons and Hess (1981).Maghayereh (2003) conduct experiments on the regularity of seasonal stock returns and it was found that January effect market anomaly presence for the returns of the Securities recorded over the period 1994-200 by using the GARCH models.

Evidence of Day of week effect from across the world

Delia et.al (2012) has Investigate the presence of the-day-of-the week and the-month-of-the-year effects in the Romanian equity market, using Bucharest Stock Exchange returns between 2000 and 2011.And found the presence of Thursday effect in Romanian equity market, and do not find any traditional Monday or January effect for the entire sample period. Further stated that Romanian equity market is reasonably efficient, where prices reflect all publicly available information and no trading rule and market timing can be used to generate abnormal returns. Elena. Valentina Tilica (2015) has investigated the intra-month effect on the the Bucharest Stock Exchange for the time frame of 2005-2014,from the daily account the daily evolution of the BET Composite Index. The results showed that the semi-monthly effect is not present on the market. However, the turn-of-the-month effect is present. Macide Cicek (2013) there exists no evidence of the day-of-the-week on the volatility in Turkish stock markets. Rasa Norvaisiene, Jurgita Stankeviciene and Ausrine Lakstutiene (2015) investigate trends in seasonality in daily returns in the Baltic stock markets for the period of 2003 – 2014. It was evidenced that Halloween effect exists in Estonia and Month effect exists in Estonia and Lithuania. Guglielmo Maria Caporale and Valentina Zakirova (2017) results evident the calendar anomalies disappear, and therefore, there is no evidence of exploitable profit opportunities based on them that would be inconsistent with market efficiency. Kok Kim Lian (2002) in an investigation of the turn of the month effect anomaly in Asia-Pacific securities exchange recorded this impact to be the vast in all stock exchanges however but the half-month impact was found to be less stable in this market.

Evidence of Day of week effect in Indian context

Ritesh & Mitesh (2011) daily return seasonality are not accompanied by any volatility seasonality.Arumugam and Soundararajan (2013) found that none of the company has asymmetrical returns in the Indian stock markets. Samveg & Mallikarjun (2014) finds that after introducing T+2 settlement ,the   day of effect exist in return but not in volatility in Indian stock market.Sen (2013) founds no day-of- the- week effect in the daily NIFTY return after introducing T+2 rolling settlement periods, Raj and Kumari (2006) find that, the returns are positive on Mondays and negative on Tuesdays and also found significant april effect .Srinivasan and Kalaivani (2013) prove that the average return on Monday is significantly higher than the average return of Wednesday and finds

Monday and Wednesday effect. Sarma (2004) finds that Monday-Friday set for all the indices has the highest positive deviation. Aziz and Ansari (2015) positive Monday effect in Sensex and a positive Wednesday effect in Nifty are present in the entire sample period.Lodha and Soral (2015) Monday was found to be most significant day for most of the indices of BSE. In case of month-of-the-year effect, September and December were providing significant returns. Poornima & Chitra (2014) reveals that there is no Friday effect in NSE NIFTY.Nageswari and Selvam(2011) observed no day-of- the- week effect and monthly effect in Indian stock market.

Methodology

We collect the data for our sample from capitaline database for BSE Sensex the sample period start from 1st January 2010 to 31st December 2020 which includes totals of 2478 closing prices and Excel is applied to convert the daily closing prices into logarithm returns and further conducted descriptive statistics and regression output to compute the T test with significance level of 0.05, F test and get the P-value. We sort out data by grouping all the Mondays and other day of week etc, followed by grouping January, February and son on for all the days of the week and monthly data. We have used excel for plotting the tables and graphs for the respective effect.

Hypothesis testing for the day of week effect

H0: µ1= µ2
HA: µ1 ≠ µ2
µ1= Average daily log returns of the investigated day in a week
µ2 = Average daily log returns of the rest of days in a week

To test the day of effect in Indian stock market, we compare the average daily returns of Monday with that of all the other days in a week and also we tested for every other day daily returns of the week are significantly different from all other days in week.

Hypothesis testing for the month effect
H0: µ1= µ2
HA: µ1 ≠ µ2
µ1= Average monthly log returns of the investigated month in a year
µ2 = Average monthly log returns of the rest of months in a year
To test the month effect in Indian stock market, we compare the average monthly returns of January with that of all the other months in a year and also we tested for every other months average returns are significantly different from all other months in a year.

Limitation of the study:

The study area focus only on BSE Sensex Index for the sample period of the 10 years covering the period from January 2010 to Dec 2020 and data analysis are performed by excel data analysis tool pack.

Empirical Analysis and Results

In order to examine the calendar effect, he ANOVA model Analysis of variance which is in quantitative in nature are applied .The following model is used in the study, for Monday effect, all other days are considered as independent variable, if the trading day is Tuesday, and to measure the Tuesday effect, here we assume all other days except Tuesday to be the independent variable. The following the regression output is presented below in the table 1.

Table 1: descriptive statistics and regression output for day of week effect 2010-2020

| Weekday	N	Mean	SD	F-test	Significance	T-test	P-value
Monday	488	-0.053	1.304	0.799	0.372	-0.985	0.325
other days	1952	0.057	1.049			0.894	0.372
Tuesday	488	0.067	1.064	0.612	0.434	1.435	0.152
other days	1952	0.027	1.115			-0.783	0.434
Wednesday	488	0.076	0.944	0.641	0.424	1.740	0.082
other days	1952	0.025	1.142			0.800	0.424
Thursday	488	0.014	1.092	0.238	0.626	0.316	0.752
other days	1952	0.040	1.108			-0.487	0.626
Friday	488	0.071	1.090	0.852	0.356	1.482	0.139
other days	1952	0.026	1.109			-0.923	0.356

Source: Excel output
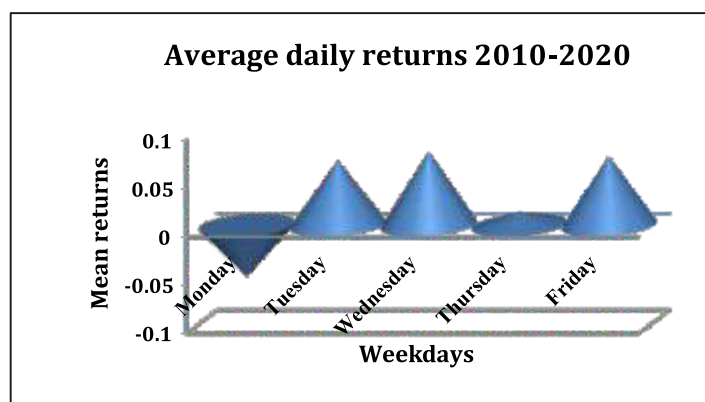
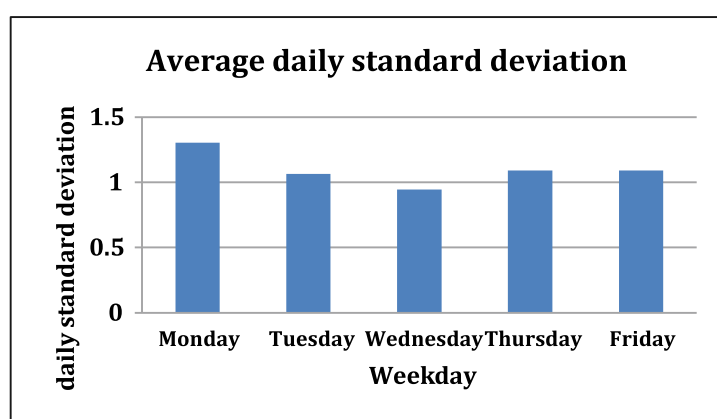**Figure 1.a Average daily mean returns for day of the week 2010-2020**

Fig 1.b Average daily standard deviation for day of the week 2010-2020

Discussion of the results :From the above table 1, Its show that, the mean of daily returns for Monday is negative (-0.053) and all other days having positive returns, while Tuesday daily returns as least positive and Wednesday daily mean returns are higher positive, the difference in the daily mean returns between Wednesday and Friday are very fractional .Interestingly we can observe for the Monday having mean returns lower value (-0.053) and higher standard deviation (1.304) compare to the rest of other days in week. The result of t-test are higher than the significance level(α=0.05) ,the hypothesis of mean returns of Monday is significantly different from the rest of the other days can be rejected .The Monday and Friday returns are statistically not significant from that of others. The p-value and t –test is insignificant and this indicate that the mean return difference between any investigated day and the other days is not significant for this period .In other words, there is no significant day of week effect found during 2010 to2020.From the above figure 1.a ,we can see that for period of 2010- 2020 , Monday has negative returns and all other days have positive mean returns, while

Thursday has lowest mean positive return and but Wednesday returns are higher than all other days, the Friday and Wednesday returns are marginally different but not the big difference. where as in from the table. 1.b shows the average standard deviation in the daily mean returns ,its noted that , Monday has higher standard deviation and followed by Tuesday and Friday ,interestingly we observe that, Wednesday has lower standard deviation compare to all the rest of the days in the week. This can be noted that, Wednesday has higher mean returns and lower standard deviation.

In order to study the month of the year effect of calendar anomaly, we have applied regression analysis for understanding the effect of each month. An ANOVA model is run on each month wise price data by considering the January as dependent variable and all other months considered as independent variable and further this is continued for all other months on the similar methodology. The output results as shown in the table 2 for the regression output.

Table 2: descriptive statistics and regression output for month week effect 2010-2020

| Calendar month	N	Mean	SD	F-test	Significance	T-test	P-value
January	189	0.052	0.912	0.619	0.433	0.897	0.371
other months	2079	0.047	0.996			-0.787	0.433
February	189	-0.049	0.961	0.001	0.981	-0.688	0.493
other months	2079	0.056	0.991			-0.023	0.981
March	189	0.135	0.962	1.251	0.265	2.057	0.041
other months	2079	0.040	0.991			-1.118	0.265
April	189	0.118	1.228	0.064	0.800	1.270	0.205
other months	2079	0.041	0.964			0.253	0.800
May	189	0.062	0.996	0.387	0.534	0.940	0.348
other months	2079	0.046	0.988			-0.622	0.534
June	189	0.078	0.904	0.006	0.940	1.154	0.250
other months	2079	0.045	0.996			0.076	0.940
July	189	0.056	0.788	0.973	0.325	1.112	0.268
other months	2079	0.047	1.005			-0.986	0.325
August	189	-0.066	1.105	0.035	0.851	-0.836	0.404
other months	2079	0.058	0.977			0.188	0.851
September	189	0.022	1.193	0.556	0.457	0.114	0.909
other months	2079	0.050	0.968			0.746	0.457
October	189	0.179	0.969	0.012	0.914	2.521	0.013
other months	2079	0.036	0.990			-0.108	0.914
November	189	-0.016	0.861	0.759	0.385	-0.097	0.923
other months	2079	0.053	1.000			-0.871	0.385
December	189	0.000	0.885	0.036	0.849	-0.040	0.968
other months	2079	0.052	0.998			0.191	0.849

Source: Excel output
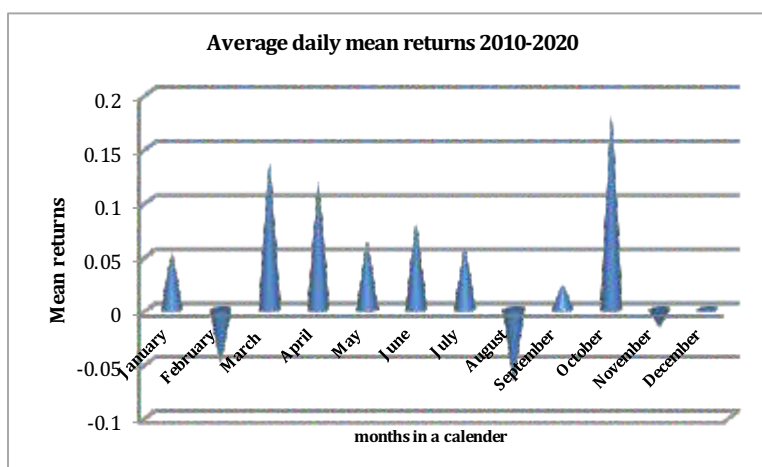
Figure 2.a Average monthly mean returns for all the months in a year from 2010-2020
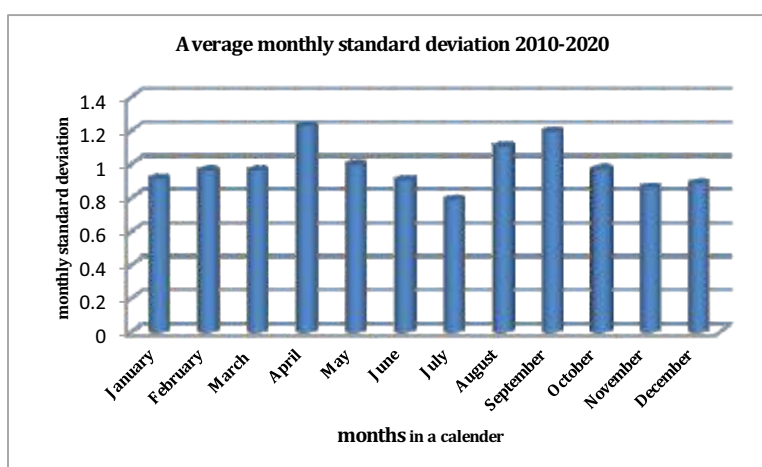

Figure 2.b Average monthly standard deviation for all the months in a year from 2010-2020

Discussion of the results : The value of mean returns and standard deviation for every month can be observe from the above table 2 .The mean returns for the month of October (0.179) and march (0.139) and lower negative returns for August (-0.066) and February (-0.049) and December has mean returns of (0.000) and January (0.052) .The standard deviation of higher for April (1.228) and has lower for July (0.788) .The results of T-test for the period of 2010 to 2020 shows not significant effect of either January of December effect . For the January the p-value is 0.371 and December (0.968) higher than significance level(α=0.05).Instead we observe the March p value is (0.041) and October p value (0.013) is lower than significance level(α=0.05) and the t-test is significant ,the null hypothesis stating average monthly returns of the investigated are not different in a year is rejected. Thus March and October effect is found to significant and exist in

the Indian stock market during the sample period from 2010-2020.mFrom the above figure 2.a, we can see that negative returns on February, August and November and lowest is for August which has the value (-0.066) and October has higher positive returns followed by March and October, where as for the month of December has lowest positive return. Interestingly we observe the lowest positive returns in the month of December and better positive returns in the month of January.

The monthly standard deviation trend is shown in figure 2.b, the monthly standard deviation for the month of April and September has higher standard deviation and while for the month of December has higher variation than January. This can be noted that, December has higher variation.

Findings and Discussion of Results

The following are the findings from this study

● There is no strong evidence of existence of day of the week effect anomaly in BSE Sensex as week find weak positive results for Wednesday and Thursday day in a week effect.

● This study also could not witness the weekend effect of Monday low and Friday high for the sample period 2010-2020 in BSE Sensex Indices.

● The study on monthly series of BSE Sensex Indices indicates that there exists March and October effect is found to significant and calendar effect of month of the year effect exist in the Indian stock market.

● The results established from the study indicated that Indian stock is not efficient and investors can improve their returns on portfolio of investments.

● The results have also favorable impact in foreign investment into Indian stock market as given the weak form of market efficiency.

Conclusion:

In this study, we updated the evidence on most popular calendar anomalies that is day of week effect and month effect. We applied a descriptive analysis, regression model and examined BSE Sensex Indices for the sample period of the 10 years covering the period from January 2010 to Dec 2020 and data analysis are performed by excel data analysis tool pack..In descriptive analysis ,the results exhibits Monday negative and Wednesday ,Friday has positive returns respectively .However ,t test results indicates, The Monday and Friday returns are statistically not significant from that of others days . In other words, there is no significant day of week effect. While for August which has the higher negative value and October has higher positive return Thus March and October effect is found to significant. The results established that Indian stock market is not efficient and market participants can improve their return on investment by right timing their funds. This helps the fund manager and market participants to re adjust the investment strategies accordingly for those who design their investment strategies on BSE Sensex Indices.

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